

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: June 12, 2019 (updated July 22, 2019)

TO: Lisa Creegan – SER

FROM: Wade Strickland – WY/3

SUBJECT: Water Quality-Based Effluent Limitations for the Sussex Wastewater Treatment Facility
WPDES Permit No. WI-0020559-08

This is in response to your request for a reevaluation of the need for water quality-based effluent limitations (WQBELs) using updated receiving water low flows and Chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Sussex Wastewater Treatment Facility in Waukesha County. This municipal wastewater treatment facility (WWTF) discharges to the Spring Creek, located in the Upper Fox River/Illinois Watershed in the Fox (IL) River Drainage Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD ₅ May – October November – April			5.0 mg/L 10 mg/L	5.0 mg/L 10 mg/L		1
TSS			10 mg/L	10 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		7.0 mg/L				1
Ammonia Nitrogen April May – September October November – March	6.7 mg/L 6.7 mg/L 6.7 mg/L 6.7 mg/L		6.7 mg/L 4.8 mg/L 6.7 mg/L 6.7 mg/L	3.2 mg/L 1.9 mg/L 3.8 mg/L 5.0 mg/L		4,5
Fecal Coliform May – September			780#/100 mL geometric mean	400#/100 mL geometric mean		
Phosphorus Interim Final				0.6 mg/L 0.225 mg/L	0.075 mg/L 3.2 lbs/day	3
Mercury						1,2
Chloride			396 mg/L			6
Chronic WET						7, 8
Acute WET						7, 8
Temperature, Max October – January						2
Nitrogen, Total						1,2

Footnotes:

1. No changes from the current permit
2. Monitoring only
3. The interim limit of 0.6 mg/L should be effective upon permit reissuance. The final WQBELs will be effective on 10/01/2021.
4. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 < pH ≤ 6.1	55	7.0 < pH ≤ 7.1	34	8.0 < pH ≤ 8.1	7.1
6.1 < pH ≤ 6.2	54	7.1 < pH ≤ 7.2	30	8.1 < pH ≤ 8.2	5.9
6.2 < pH ≤ 6.3	53	7.2 < pH ≤ 7.3	27	8.2 < pH ≤ 8.3	4.8
6.3 < pH ≤ 6.4	52	7.3 < pH ≤ 7.4	24	8.3 < pH ≤ 8.4	4.0
6.4 < pH ≤ 6.5	50	7.4 < pH ≤ 7.5	20	8.4 < pH ≤ 8.5	3.3
6.5 < pH ≤ 6.6	48	7.5 < pH ≤ 7.6	17	8.5 < pH ≤ 8.6	2.7
6.6 < pH ≤ 6.7	46	7.6 < pH ≤ 7.7	15	8.6 < pH ≤ 8.7	2.3
6.7 < pH ≤ 6.8	43	7.7 < pH ≤ 7.8	12	8.7 < pH ≤ 8.8	1.9
6.8 < pH ≤ 6.9	40	7.8 < pH ≤ 7.9	10	8.8 < pH ≤ 8.9	1.6
6.9 < pH ≤ 7.0	37	7.9 < pH ≤ 8.0	8.6	8.9 < pH ≤ 9.0	1.4

If the variable daily maximum limit table is used in place of the single limit, the weekly average limits would remain the same as the current permit.

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April	Variable	7.8	3.2
May – September	Variable	4.8	1.9
October	Variable	9.5	3.8
November – March	Variable	12.5	5.0

5. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7) are included in bold.
6. This is the WQBEL for chloride. Alternative effluent limitations of 500 mg/L for May - November and 511 mg/L for December - April as a weekly average may be included in the permit in place of this limit if the chloride variance application that was submitted is approved by EPA. These limits are the same as the current permit limits.
7. Following the guidance provided in the Department's WET Program Guidance Document (revision #11, dated November 1, 2016), based upon the point totals generated by the WET Checklist, other information given above, and Chapter 1.3 of the WET Guidance Document, annual acute and chronic WET tests are recommended in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing shall continue after the permit expiration date (until the permit is reissued).
8. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5%. The Instream Waste Concentration to assess chronic test results is 99%. The primary control and dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water. Tests should be done in rotating quarters, to collect seasonal information about this discharge and shall continue after the permit expiration date (until the permit is reissued).

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Nicole Krueger at (414)-263-8650 or Diane Figiel at (608) 264-6274 (Diane.Figiel@wisconsin.gov).

Attachments (4) – Narrative, Thermal Table, Map & Ambient Chloride Data

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Water Quality-Based Effluent Limitations for Sussex Wastewater Treatment Facility

WPDES Permit No. WI-0020559-07

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description:

The Village of Sussex operates a 5.1 MGD wastewater treatment plant with a design capacity of 6790 lbs/day BOD. The plant has a mechanical bar screen, grit remover, a 3-ring, extended aeration, oxidation ditch (Orbal), three final clarifiers, four tertiary sand filters, and seasonal disinfection with ultraviolet light. Polyaluminum chloride is added at the central ring of the ditch for phosphorus removal. Effluent is discharged to the east bank of Spring Creek. Biosolids are land applied to agricultural land.

Attachment #2 is a map of the area showing the approximate location of Outfall 001.

Existing Permit Limitations: The current permit, expiring on 09/30/2019, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						
BOD ₅						1
May – October			5.0 mg/L	5.0 mg/L		
November – April			10 mg/L	10 mg/L		
TSS			10 mg/L	10 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		7.0 mg/L				1
Ammonia Nitrogen						
April	11.4 mg/L		7.8 mg/L	3.2 mg/L		
May – September	11.4 mg/L		4.8 mg/L	1.9 mg/L		
October	11.4 mg/L		9.5 mg/L	3.8 mg/L		
November – March	11.4 mg/L		12.5 mg/L	5.0 mg/L		
Fecal Coliform				400#/100 mL geometric mean		1
Phosphorus						
Interim				0.85 mg/L		
Final				0.225 mg/L	0.075 mg/L 3.2 lbs/day	
Mercury, Total Recoverable						3
Chloride						
May – November			500 mg/L			
December – April			511 mg/L			

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Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Chronic WET						4
Acute WET						4
Temperature, Max November – January						5
Nitrogen, Total						5

Footnotes:

1. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
2. This is an interim limit. The final WQBEL is 0.075 mg/L or 3.2 lbs/day as a six-month average and 0.225 mg/L as a monthly average. A compliance schedule is in the current permit to meet the final WQBEL by March 30, 2022.
3. Annual monitoring only.
4. Annually in rotating quarters.
5. Monitoring only.

Receiving Water Information:

- Name: Spring Creek
- Classification: Warm water sport fish community, non-public water supply.
- Low Flow: The following updated 7-Q₁₀ and 7-Q₂ values at the Outfall location were provided in a June 20, 2019 letter from USGS. The Harmonic Mean has been estimated as recommended in *State of Wisconsin Water Quality Rules Implementation Plan* (Publ. WT-511-98)
 - 7-Q₁₀ = 0.23 cfs (cubic feet per second)
 - 7-Q₂ = 0.39 cfs
 - 90-Q₁₀ = 0.33 cfs
 - Harmonic Mean Flow = 1.35 cfs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q₁₀ (cfs)	0.4	0.42	0.67	1.0	0.61	0.42	0.31	0.29	0.27	0.34	0.48	0.41
7-Q₂ (cfs)	0.77	0.86	1.5	1.8	1.3	0.85	0.62	0.54	0.57	0.70	0.89	0.80

- Hardness = 377 mg/L as CaCO₃. This value represents the geometric mean of data from WET testing 2014-2019 (n=9).
- % of low flow used to calculate limits: 25%
- Source of background concentration data: Metals data from Spring Creek is used for this evaluation from SWIMS Station 683226. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. The facility has collected background chloride data upstream of their outfall from 12/14/2005 to 07/20/2018 (data is summarized in Attachment #4). Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: None
- Impaired water status: Spring Creek is impaired at the point of discharge for phosphorus.

Effluent Information:

- Design Flow Rate(s):
Annual average = 5.1 MGD (Million Gallons per Day)
For reference, the actual average flow from 11/01/2014 - 03/31/2019 was 1.94 MGD.
- Hardness = 377 mg/L as CaCO₃. This value represents the geometric mean of data from 12/10/2018 - 12/21/2018 submitted as part of the permit application.
- Acute dilution factor used: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water Source: Domestic wastewater with water supply from wells
- Additives: Polyaluminum chloride is added for phosphorus removal.
- Effluent characterization: This facility is categorized as a major municipal discharger, so the permit application required effluent sample analyses for all the “priority pollutants” except for the Dioxins and Furans.

Sample Date	Copper µg/L	Sample Date	Copper µg/L	Sample Date	Copper µg/L
12/10/2018	2.1	12/26/2018	12	1/14/2019	19
12/13/2018	12	12/30/2018	10	1/20/2019	4.0
12/17/2018	11	1/3/2019	6.0	1/24/2019	2.7
12/21/2018	9.3	1/10/2019	8.3		
1-day P ₉₉ = 25.9 µg/L					
4-day P ₉₉ = 16.1 µg/L					

“<” means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.

11/01/2014 -03/06/2019	Chloride mg/L
1-day P ₉₉	682
4-day P ₉₉	570
30-day P ₉₉	506
Mean	472
Std	78
Sample size	215
Range	304-722

	Mercury ng/L	Mercury Blank ng/L
05/18/2015	0.24	<0.1
06/06/2016	0.67	0.27
09/12/2017	0.30	0.15
10/15/2018	0.31	0.14
Mean	0.38	0.14

Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”.

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The following table presents the average concentrations and loadings at Outfall 001 from 11/01/2014 - 03/31/2019 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6):

	Average Measurement
BOD ₅	0.45 mg/L*
TSS	1.42 mg/L*
pH field	7.67 s.u.
Phosphorus	0.28 mg/L
Ammonia Nitrogen	0.03 mg/L*
Chloride	472 mg/L
Fecal Coliform	6.06#/100mL

*Results below the level of detection (LOD) were included as zeroes in calculation of average.

PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

In general, permit limits for toxic substances are recommended whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P₉₉) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q₁₀

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Adm. Code (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q₁₀ receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards.

$$\text{Limitation} = \frac{(\text{WQC}) (Q_s + (1-f) Q_e) - (Q_s - f Q_e) (C_s)}{Q_e}$$

Where:

WQC = Acute toxicity criterion or secondary acute value according to ch. NR 105

Q_s = average minimum 1-day flow which occurs once in 10 years (1-day Q₁₀)

if the 1-day Q₁₀ flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q₁₀).

Q_e = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d)

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

C_s = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e).

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As a rule of thumb, if the receiving water is effluent dominated under low stream flow conditions, the 1-Q₁₀ method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is the case for Sussex WWTF.

The following tables list the water quality-based effluent limitations for this discharge along with the results of effluent sampling for all the detected substances. All concentrations are expressed in terms of micrograms per Liter (µg/L), except for hardness and chloride (mg/L) and mercury (ng/L).

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0.18 cfs, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)).

SUBSTANCE	REF. HARD.* mg/L	ATC	MEAN BACK- GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Arsenic		340		346	69.5	<1.0		
Cadmium	377	47.3	0.04	48.4	9.7	<0.19		
Chromium, Total Recoverable	301	4446		4550	910	<0.83		
Chromium (+6)		16.0		16.4	3.28	4.50		
Copper	377	54.3		55.6			26	19
Lead	356	365		373	74.6	<4.3		
Nickel	268	1080		1106	221	<1.1		
Zinc	333	345	5.0	353	70.5	25		
Chloride (mg/L)		757	261	775			682	722
Mercury (ng/L)		830		849	170	0.38		

* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105 over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

** Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q₁₀ flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0.0575 cfs (¼ of the 7-Q₁₀)

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK- GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉	4-day MAX. CONC.
Arsenic		152		153	30.7	<1.0		
Cadmium	175	3.82	0.04	3.85	0.8	<0.19		
Chromium, Total Recoverable	301	326		328	65.6	<0.83		
Chromium (+6)		11		11	2.21	4.50		
Copper	377	32.2		32.4			16	
Lead	356	95.5		96.2	19.2	<4.3		
Nickel	268	120		121	24.2	<1.1		
Zinc	333	345	5.0	347	69.4	25		
Chloride (mg/L)		395	261	396			570	712
Mercury (ng/L)		440		442	88.6	0.38		

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* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105 over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

Monthly Average Limits based on Wildlife Criteria (WC)

RECEIVING WATER FLOW = 0.08 cfs (¼ of the 90-Q₁₀)

SUBSTANCE	WC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P ₉₉
Mercury (ng/L)	1.3		1.31	0.26	0.38	

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 0.3755 cfs (¼ of the Harmonic Mean)

SUBSTANCE	HTC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Antimony	373		391	78.1	0.32
Cadmium	370	0.04	388	77.5	<0.19
Chromium, Total Recoverable	3818000		3999673	799935	<0.83
Lead	140		147	29.3	<4.3
Nickel	43000		45046	9009	<1.1
Methylene Chloride	95000		99520	19904	0.25*
Mercury (ng/L)	1.5		1.6	0.31	0.38

*QC Flag, suspected of laboratory contamination

Conclusions and Recommendations: Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations for chloride and additional monitoring for mercury are recommended.

Chromium (+6) – A limit is not recommended for chromium (+6) because total recoverable chromium was not detected and is considered the maximum hexavalent chromium concentration possible. The analytical test for hexavalent chromium is less reliable than the test for total recoverable chromium.

Chloride – Considering available effluent data from the current permit term (11/01/2014 - 03/31/2019) the 1-day P₉₉ chloride concentration is 682 mg/L, and the 4-day P₉₉ of effluent data is 570 mg/L. The 1-day P₉₉ is below the ATC-based limit of 775 mg/L so there is not a recommendation for a daily maximum limit.

Because the 4-day P₉₉ exceeds the calculated weekly average WQBEL of 396 mg/L, an effluent limit is needed in accordance with s. NR 106.05(4)(b) Wis. Adm. Code. However, Subchapter VII of ch. NR 106 provides for a variance from water quality standards for this substance, and Sussex WWTF has requested such a variance. That variance may be granted subject to the following conditions:

- 1) The permit shall include an “Interim” limitation intended to prevent an increase in the discharge of Chloride;
- 2) The permit shall specify “Source Reduction Measures” to be implemented during the permit term, with periodic progress reports.
- 3) The permit shall include a “Target Limit” or “Target Value” to gage the effectiveness of the Source Reduction Measures, and progress toward the WQBELs.

Interim Limit for Chloride: Section NR 106.82(9) defines a “Weekly average interim limitation” as either the 4-day P₉₉ concentration or 105% of the highest weekly average concentration of the representative data. The existing permit includes weekly interim limits of 511 mg/L for December - April, and 500 mg/L for May - November. These limits were set equal to the 4-day P₉₉ for 2009 - 2013.

Ideally, the effluent chloride concentration at facilities with variances will trend downward as time goes on because of source reduction measures, and the recalculated interim limit will decline until the plant can meet the WQBEL. The effluent concentrations at Sussex WWTF have apparently increased during the past permit term (the 4-day P₉₉ from 2014 - 2019 is higher than the 2013 interim limit).

The following table shows a statistical breakdown of effluent chloride data from the current permit term.

Effluent Chloride, mg/L November 2014-March 2019			
	All data	December - April	May - November
1-day P ₉₉	682	725	625
4-day P ₉₉	570	602	534
Max 4-day average	712	712	550
Mean	472	495	453
Standard deviation	78	85	65
Sample size	215	100	115
Range	304 - 722	360-722	304-561

Although the 4-day P₉₉ effluent chloride concentrations at Sussex WWTF are higher than the current interim limits of 500 and 511 mg/L, the Department does not find it appropriate to increase the interim concentration limit in the reissued permit, since it would be counterproductive to meeting the final WQBEL. **Therefore, the current weekly average interim chloride limits are recommended for permit reissuance.**

Chloride monitoring recommendations: Four samples per month (on consecutive days) are recommended. This allows for averaging of the results to compare with the interim limit and allows the use of the average in determining future interim limits, and degree of success with chloride reduction measures.

In the absence of a variance, Sussex would be subject to the calculated weekly average WQBEL. Effluent weekly average mass limits based upon both dry and wet weather flows would also be needed for permit reissuance. In summary, the WQBELs would be as follows;

- 400 mg/L as a weekly average
- 17,000 lbs/day as a weekly average during dry weather ($400 \text{ mg/L} \times 5.1 \text{ MGD} \times 8.34$)
- 29,000 lbs/day as a weekly average during wet weather ($400 \text{ mg/L} \times 8.6 \text{ MGD} \times 8.34$) (rounded two significant figures). The peak weekly design flow was determined from the 2008 upgrade.

Mercury – The WQBEL for total recoverable mercury is set equal to the most stringent criterion of 1.3 ng/L because the background concentration in the receiving water and similar inland streams is known to exceed 1.3 ng/L.

The current permit requires annual monitoring of the influent and effluent for total recoverable mercury. A total of four effluent sampling results are available from 05/18/2015 - 10/15/2018 for total recoverable mercury. The average concentration was 0.38 ng/L, and the maximum was 0.665 ng/L. Because there were only four mercury samples during the current permit term, data from previous permits were used to determine the need for limits. Using 21 sample points from 05/10/2005 - 10/15/2018, a 30-day P₉₉ was calculated to be 0.38 ng/L which is less than the wildlife criteria and human threshold criteria. **Therefore, monitoring only is recommended.**

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. The current permit has daily maximum, weekly average and monthly average limits for Outfall 001 (calculated in 2013). These limits are re-evaluated at this time due to the following changes:

- Updates to subchapter IV of ch. NR 106, Wis. Adm. Code allow limits based on available dilution instead of limits set to twice the acute criteria.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC):

Daily maximum limitations are based on acute toxicity criteria, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation.

$$\text{ATC in mg/L} = [A \div (1 + 10^{(7.204 - \text{pH})})] + [B \div (1 + 10^{(\text{pH} - 7.204)})]$$

Where:

A = 0.411 and B = 58.4 for a Warm Water Sport fishery, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 1612 sample results were reported from 11/01/2014 - 03/31/2019. The maximum reported value was 8.8 s.u. (Standard pH Units). The effluent pH was 8.1 s.u. or less 99% of the time. The 1-day P₉₉, calculated in accordance with s. NR 106.05(5), is 8.13 s.u. and the mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.1 s.u. Therefore, a value of 8.13 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.13 s.u. into the equation above yields an ATC = 6.56 mg/L.

Potential changes to daily maximum Ammonia Nitrogen effluent limitations:

Updates to subchapter IV of ch. NR 106, Wis. Adm. Code (effective September 1, 2016) outline the option for the Department to implement use of the 1-Q₁₀ receiving water low flow to calculate daily maximum ammonia nitrogen limits if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits would apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q₁₀ (estimated as 80 % of 7-Q₁₀) and the 2×ATC approach are shown below.

Attachment #1

	Ammonia Nitrogen Limit mg/L
2×ATC	13.1
1-Q ₁₀	6.71

The 1-Q₁₀ method yields the most stringent limits for Sussex WWTF.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

Daily Maximum Ammonia Nitrogen Limits – WWSF (using 1-Q₁₀)

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 < pH ≤ 6.1	55	7.0 < pH ≤ 7.1	34	8.0 < pH ≤ 8.1	7.1
6.1 < pH ≤ 6.2	54	7.1 < pH ≤ 7.2	30	8.1 < pH ≤ 8.2	5.9
6.2 < pH ≤ 6.3	53	7.2 < pH ≤ 7.3	27	8.2 < pH ≤ 8.3	4.8
6.3 < pH ≤ 6.4	52	7.3 < pH ≤ 7.4	24	8.3 < pH ≤ 8.4	4.0
6.4 < pH ≤ 6.5	50	7.4 < pH ≤ 7.5	20	8.4 < pH ≤ 8.5	3.3
6.5 < pH ≤ 6.6	48	7.5 < pH ≤ 7.6	17	8.5 < pH ≤ 8.6	2.7
6.6 < pH ≤ 6.7	46	7.6 < pH ≤ 7.7	15	8.6 < pH ≤ 8.7	2.3
6.7 < pH ≤ 6.8	43	7.7 < pH ≤ 7.8	12	8.7 < pH ≤ 8.8	1.9
6.8 < pH ≤ 6.9	40	7.8 < pH ≤ 7.9	10	8.8 < pH ≤ 8.9	1.6
6.9 < pH ≤ 7.0	37	7.9 < pH ≤ 8.0	8.6	8.9 < pH ≤ 9.0	1.4

Weekly Average & Monthly Average Limits based on Chronic Toxicity Criteria (CTC)

No changes are recommended to the current weekly and monthly average ammonia limits.

Although there has been an increase in the receiving water low flows which may allow for increased limits, due to antidegradation rules in ch. NR 207, the limits shall not increase from current requirements unless need is demonstrated.

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from 11/01/2014 to 03/31/2019.

Ammonia Nitrogen mg/L	April	May-September	October	November-March
1-day P ₉₉	0.26	0.41	6.5	0.15
4-day P ₉₉	0.09	0.24	3.4	0.14
30-day P ₉₉	0.03	0.09	1.4	0.06
Mean *	0.01	0.01	0.33	0.01
Std	0.02	0.44	3.5	0.44
Sample size	68	357	71	432
Range	<0.07-0.27	<0.07-1.63	<0.07-9.52	<0.07-1.3

*Values lower than the level of detection were substituted with a zero

Conclusions and Recommendations:

In summary, after rounding to two significant figures, the following ammonia nitrogen limitations are recommended.

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April	6.7	7.8*	3.2
May – September	6.7	4.8	1.9
October	6.7	9.5*	3.8
November – March	6.7	12.5*	5.0

*These limits are revised based on expression of limits and are discussed further in that section of this report.

No mass limitations are recommended in accordance with s. NR 106.32(5). Additional limits to comply with expression of limit requirements are outlined in Part 7 of this document.

PART 4 – PHOSPHORUS**Water Quality-Based Effluent Limits (WQBEL)**

Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to ch. NR 102 (s. NR 102.06), which establish phosphorus standards for surface waters. Revisions to ch. NR 217 (s. NR 217, Subchapter III) establish procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102.

Section NR 102.06(3)(a) specifically names river segments for which a phosphorus criterion of 0.100 mg/L applies. S. NR 102.06(3)(b), Wis. Adm. Code specifies a phosphorus criterion of 0.075 mg/L for other stream segments that are not specified in s. NR 102.06(3)(a). The phosphorus criterion of 0.075 mg/L applies for Spring Creek.

The conservation of mass equation is described in s. NR 217.13 (2)(a), Wis. Adm. Code, for phosphorus WQBELs and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream phosphorus concentrations (Cs):

$$\text{Limitation} = [(WQC)(Qs + (1-f) Qe) - (Qs - f Qe) (Cs)] / Qe$$

Where:

WQC = 0.075 mg/L for Spring Creek

Qs = 100% of the 7-Q₂ of 0.39 cfs

Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code

Qe = effluent flow rate = 5.1 MGD = 7.9 cfs

f = the fraction of effluent withdrawn from the receiving water = 0

A previous evaluation resulted in a WQBEL of 0.075 mg/L using a background concentration of 0.17 mg/L. This median concentration was calculated from 5 samples taken by the facility from 07/25/2012 - 05/24/2013 100 yards upstream of the point of discharge. Section NR 217.13(2)(d) states that the determination of upstream concentrations shall be evaluated at each permit reissuance.

Substituting a background concentration above criteria into the limit calculation equation above would result in a calculated limit that is less than the applicable criterion of 0.075 mg/L. However, s. NR 217.13(7), Wis. Adm. Code, specifies that “if the water quality-based effluent limitation calculated pursuant to the procedures in this section is less than the phosphorus criterion specified in s. NR 102.06, Wis. Adm. Code, for the water body, the effluent limit shall be set equal to the criterion.”

The impaired water listing of Spring Creek from the point of discharge and downstream of the outfall points towards the notion that effluent phosphorus limits equal to the water quality criterion are needed to prevent the discharge from contributing to further impairment of the receiving water. Available guidance suggests setting effluent limits equal to the criterion in the absence of an EPA approved total maximum daily load for discharges of phosphorus to phosphorus impaired waters.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from 08/01/2017 - 03/31/2019. Sussex WWTF started adding polyaluminum chloride (PAC) in August 2017 and is continuing to use it. The data prior to August 2017 was not included in this evaluation because it doesn't represent current operation.

	Phosphorus mg/L
1-day P ₉₉	1.2
4-day P ₉₉	0.6
30-day P ₉₉	0.35
Mean	0.23
Std	0.24
Sample size	347
Range	0.03-1.29

Reasonable Potential Determination

Since the previous permit included an interim limit of 0.85 mg/L, and the calculated WQBEL using s. NR 217.13, Wis. Adm. Code is more restrictive, s. NR 217.15, Wis. Adm. Code states that the Department shall include the water quality based effluent limit in the permit. For additional reasoning, it is noted that the 30-day P₉₉ of reported effluent total phosphorus data (0.35 mg/L) greatly exceeds the calculated water quality based effluent limit for total phosphorus. This information indicates that **the discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion of 0.075 mg/L**. For these reasons, **a final water quality-based effluent limit of 0.075 mg/L is recommended.**

Limit Expression

Because the calculated WQBEL is less than or equal to 0.3 mg/L, the effluent limit of 0.075 mg/L may be expressed as a six-month average. If a concentration limitation expressed as a six-month average is included in the permit, a monthly average concentration limitation of 0.225 mg/L, equal to three times the WQBEL calculated under s. NR 217.13 shall also be included in the permit. The six-month average should be averaged during the months of May – October and November – April.

Mass Limits

Because the discharge is to a surface water that is phosphorus impaired, a mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code. **This final mass limit shall be $0.075 \text{ mg/L} \times 8.34 \times 5.1 \text{ MGD} = 3.2 \text{ lbs/day}$ expressed as a six-month average.**

Interim Limit

An interim limit is required per s. NR 217.17 when a compliance schedule is needed in the permit to meet the WQBEL. The interim limit should reflect a concentration that the facility is able to meet without investing in additional “temporary” treatment, but also should prevent backsliding from current conditions. Therefore, **it is recommended that the interim limit be set equal to 0.6 mg/L for permit reissuance.** This value reflects the 4-day P_{99} concentration of 0.6 mg/L derived from monitoring data collected since August 2017. This value is recommended instead of the 30-day P_{99} concentration of 0.35 mg/L since the facility hasn’t optimized the dosage of PAC for phosphorus removal, so it allows for flexibility.

PART 5 – THERMAL

New surface water quality standards for temperature took effect on October 1, 2010. These new regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification.

In accordance with s. NR 106.53(2)(b), the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation.

The table below summarizes the maximum temperatures reported during monitoring from 04/01/2012-03/31/2013. This data was used to be able to evaluate every month of data. The full thermal table is in Attachment #3.

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	49	77	49.3	76.5
FEB	50	77	50.3	76.7
MAR	52	77	52.2	77.4
APR	55	79	55.1	79.2
MAY	65	82	65.1	82.2
JUN	76	84	76.1	84.2
JUL	81	85	81.2	85.2

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Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
AUG	81	84	81.3	84.3
SEP	73	83	73.3	82.5
OCT	61	81	61.3	80.6
NOV	49	78	49.2	77.8
DEC	49	77	49.3	76.7

Sussex WWTF submitted a dissipative cooling request and stream study performed in November 19, 2013. The Department concurred that the dissipation of heat is sufficient to not have an adverse impact on the stream. It was indicated in the permit application that there haven't been substantial changes in operation or thermal loadings to the receiving water. **Therefore, no thermal limits are recommended. Monitoring during the months of October, November, December, and January is recommended. Also, the addition monthly monitoring one entire year of the permit term is recommended so that an entire year of data can be used for evaluation.**

Dissipative Cooling Evaluation

Dissipative cooling requests must be re-evaluated every permit reissuance. The permittee is responsible to submit an updated DC request prior to permit reissuance. Such a request must either include:

- A statement by the permittee that there have been no substantial changes in operation of, or thermal loadings to, the treatment facility and the receiving water; or
- New information demonstrating DC to supplement the information used in the previous DC determination. If significant changes in operation or thermal loads have occurred, additional DC data must be submitted to the Department.

PART 6 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. The following evaluation is based on procedures in the Department's WET Program Guidance Document (revision #11, dated November 1, 2016).

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC₅₀ (Lethal Concentration to 50% of the test organisms) greater than 100% effluent.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC₂₅ (Inhibition Concentration) greater

Attachment #1

than the instream waste concentration (IWC). The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 99% shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6):

$$\text{IWC (as \%)} = Q_e \div \{(1 - f) Q_e + Q_s\} \times 100$$

Where:

Q_e = annual average flow = 5.1 MGD = 7.9 cfs

f = fraction of the Q_e withdrawn from the receiving water = 0

Q_s = $\frac{1}{4}$ of the 7- Q_{10} = 0.23 cfs \div 4 = 0.05725 cfs

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data. Data which is not believed to be representative of the discharge is not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations.

WET Data History

Date Test Initiated	Acute Results LC ₅₀ % (% survival in 100% effluent)				Chronic Results IC ₂₅ %					Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Algae (IC ₅₀ %)	Pass or Fail?	Use in RP?	
11/04/2014	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
05/19/2015	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
08/23/2016	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
01/24/2017	>100	>100	Pass	Yes	90.7	>100		Fail	No	1
02/21/2017					>100	>100		Pass	Yes	
02/28/2017					>100	>100		Pass	Yes	
10/31/2017	>100	>100	Pass	Yes	>100	>100		Fail	No	1
11/28/2017						>100		Pass	Yes	
01/22/2019	>100	>100	Pass	Yes	>100	>100		Pass	Yes	

Footnotes:

1. *Qualified or Inconclusive Data.* The test did not meet test acceptability requirements and had to be repeated.
- WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. **WET limits**

must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.

$$\text{Acute Reasonable Potential} = [(TUa \text{ effluent}) (B)(AMZ)]$$

$$\text{Chronic Reasonable Potential} = [(TUC \text{ effluent}) (B)(IWC)]$$

According to s. NR 106.08(6)(d), TUa and TUC effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC_{50} , IC_{25} or $IC_{50} \geq 100\%$).

Acute Reasonable Potential = $0 < 1.0$, reasonable potential is not shown, and a limit is not required.

Chronic Reasonable Potential = $0 < 1.0$, reasonable potential is not shown, and a limit is not required.

The WET Checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other permit conditions. The Checklist steps the user through a series of questions that evaluate the potential for effluent toxicity. The Checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code, and recommends monitoring frequencies based on points accumulated during the Checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. The completed WET Checklist recommendations for this permittee are summarized in the table below. Staff recommendations, based on the WET Checklist and best professional judgment, are provided below the summary table. For guidance related to reasonable potential and the WET Checklist, see Chapter 1.3 of the WET Guidance Document: <http://dnr.wi.gov/topic/wastewater/WETguidance.html>.

WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. 0 Points	IWC = 99% 15 Points
Historical Data	6 tests used to calculate RP = 0. No tests failed. 0 Points	7 tests used to calculate RP = 0. No tests failed. 0 Points
Effluent Variability	History of chloride violations. 5 Points	Same as Acute. 5 Points
Receiving Water Classification	Full Fish & Aquatic Life 5 Points	Same as Acute. 5 Points
Chemical-Specific Data	Limits for no substances based on ATC; Copper, chloride, mercury, ammonia and zinc detected. Additional Compounds of Concern: Antimony 5 Points	Limits for chloride based on CTC; Copper, chloride, mercury, zinc, and ammonia detected. Additional Compounds of Concern: Antimony 10 Points
Additives	0 Biocides and 1 Water Quality Conditioners added. SorbX-100 Used: No 1 Point	All additives used more than once per 4 days. 1 Point
Discharge Category	2 Industrial Contributors. 6 Points	Same as Acute. 6 Points

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	Acute	Chronic
Wastewater Treatment	Secondary or Better 0 Points	Same as Acute. 0 Points
Downstream Impacts	No impacts known 0 Points	Same as Acute. 0 Points
Total Checklist Points:	22 Points	42 Points
Recommended Monitoring Frequency (from Checklist):	1x yearly (rotating quarters)	1x yearly (rotating quarters)
Limit Required?	No	No
TRE Recommended? (from Checklist)	No	No

- Following the guidance provided in the Department's WET Program Guidance Document (revision #11, dated November 1, 2016), based upon the point totals generated by the WET Checklist, other information given above, and Chapter 1.3 of the WET Guidance Document, annual acute and chronic WET tests are recommended in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing shall continue after the permit expiration date (until the permit is reissued).
- A minimum of annual acute and chronic monitoring is recommended because Sussex WWTF is a major municipal discharger with a design flow greater than 1.0 MGD. Federal regulations at 40 CFR Part 122.21(j) require at least four acute and chronic WET tests with each permit application on samples collected since the previous reissuance. Therefore, annual monitoring is recommended in the permit term, so that data will be available for the next permit application.

PART 7 – EXPRESSION OF LIMITS

Revisions to chs. NR 106 and 205, Wis. Adm. Code align Wisconsin's water quality-based effluent limits with 40 CFR 122.45(d), which requires WPDES permits contain the following concentration limits, whenever practicable and necessary to protect water quality:

- Weekly average and monthly average limitations for continuous discharges subject to ch. NR 210.
- Daily maximum and monthly average limitations for all other discharges.

Sussex WWTF is a municipal treatment facility and is therefore subject to weekly average and monthly average limitations whenever limitations are determined to be necessary.

This evaluation provides additional limitations necessary to comply with the expression of limits in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code. Pollutants already compliant with these rules or that have an approved impracticability demonstration, are excluded from this evaluation including water-quality based effluent limitations for phosphorus, temperature, and pH, among other parameters. Mass limitations are not subject to the limit expression requirements if concentrations limits are given.

Method for calculation:

The methods for calculating limitations for continuous discharges subject to ch. NR 210 to conform to 40 CFR 122.45(d) are specified in s. NR 106.07(3), and are as follows:

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1. Whenever a daily maximum limitation is determined necessary to protect water quality, a weekly and monthly average limitation shall also be included in the permit and set equal to the daily maximum limit unless a more restrictive limit is already determined necessary to protect water quality.
2. Whenever a weekly average limitation is determined necessary to protect water quality, a monthly average limitation shall also be included in the permit and set equal to the weekly average limit unless a more restrictive limit is already determined necessary to protect water quality.
3. Whenever a monthly average limitation is determined necessary to protect water quality, a weekly average limit shall be calculated using the following procedure and included in the permit unless a more restrictive limit is already determined necessary to protect water quality:

$$\text{Weekly Average Limitation} = (\text{Monthly Average Limitation} \times \text{MF})$$

Where:

MF= Multiplication factor as defined in Table 1

CV= coefficient of variation (CV) as calculated in s. NR 106.07(5m)

n= the number of samples per month required in the permit

s. NR 106.07 (3) (e) 4. Table 1 — Multiplication Factor (for CV = 0.6)

CV	n=1	n=2	n=3	n=4	n=8	n=12	n=16	n=20	n=24	n=30
0.6	1.00	1.31	1.51	1.64	1.95	2.12	2.23	2.30	2.36	2.43

Note: This methodology is based on the *Technical Support Document for Water Quality-based Toxics Control* (March 1991). PB91-127415.

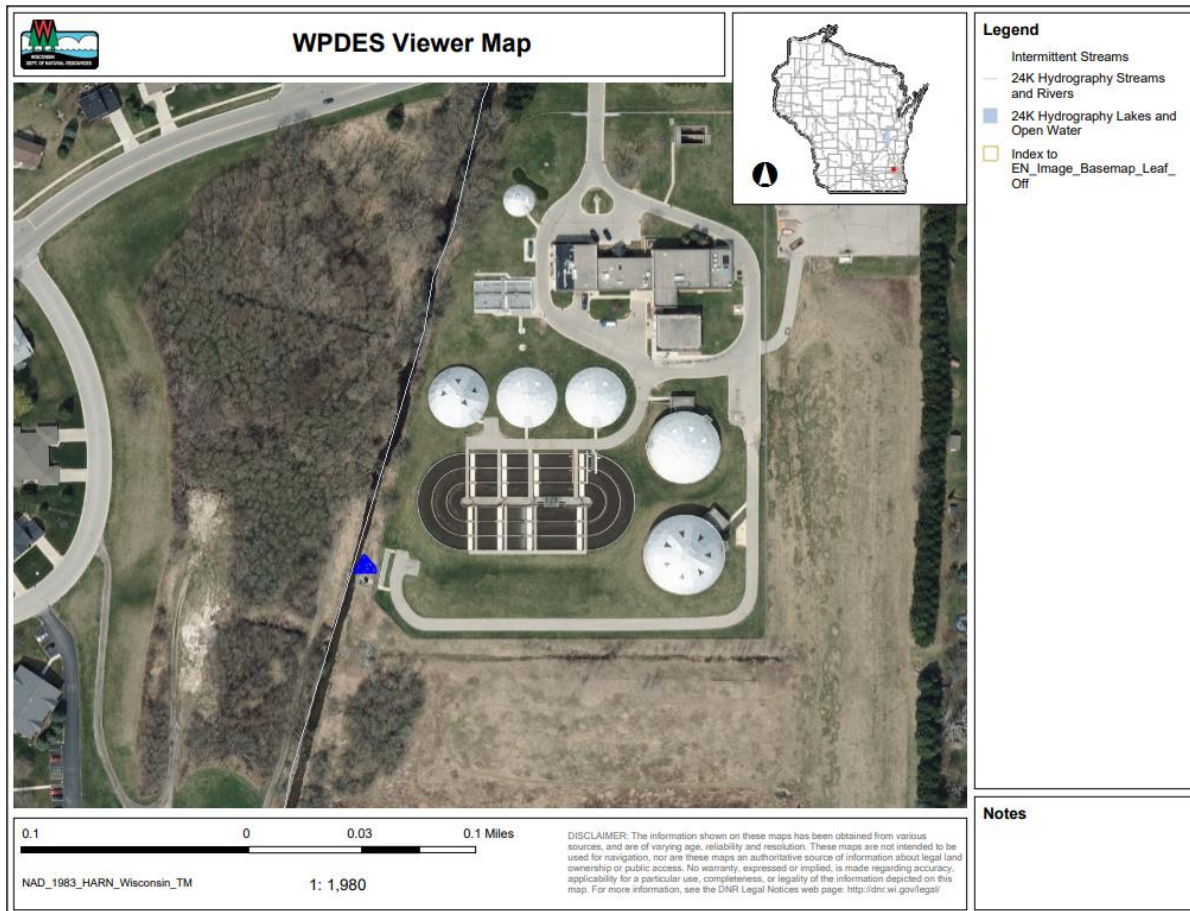
Summary of Additional Limitations:

In conclusion, the following additional limitations are required to comply with ss. NR 106.07 and NR 205.065(7) Expression of Limits.

Parameter	Daily Maximum	Weekly Average	Monthly Average	Weekly Geometric Mean	Monthly Geometric Mean	Multiplication Factor (CV)	Assumed Monitoring Frequency (n)
Fecal Coliform May-September				780 #/100 mL	400 #/100 mL	1.95 (0.6)	2/Week (8)
Ammonia Nitrogen							
April	6.7 mg/L	6.7 mg/L*	3.2 mg/L				
May – September	6.7 mg/L	4.8 mg/L	1.9 mg/L				
October	6.7 mg/L	6.7 mg/L*	3.8 mg/L				
November – March	6.7 mg/L	6.7 mg/L*	5.0 mg/L				

* If the variable daily maximum limit table is used in place of the single limit, the weekly average limits would remain the same as the current permit.

Attachment #2
Map of Outfall Location



Attachment #3

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility: Sussex WWTF
Outfall(s): 001
Date Prepared: 07/17/2019
Design Flow (Qe): 5.10 MGD

7-Q₁₀: 0.23 cfs
Dilution: 25%
f: 0
Stream type: Small warm water sport or forage fish co ▼
Qs:Qe ratio: 0.0 :1
Calculation Needed? YES

Temp Dates
Start: 04/01/12
End: 03/31/13

Flow Dates
Start: 01/01/12
End: 12/30/13

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs) (cfs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl) (MGD)	Daily Maximum Flow Rate (Qea) (MGD)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)		(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	0.23	2.108	2.978	0	50	51	49	77
FEB	34	50	76	0.23	2.105	2.279	0	48	48	50	77
MAR	38	52	77	0.23	2.698	3.528	0	48	48	52	77
APR	48	55	79	0.23	4.929	6.895	0	54	55	55	79
MAY	58	65	82	0.23	3.394	4.007	0	59	60	65	82
JUN	66	76	84	0.23	3.514	3.946	0	65	66	76	84
JUL	69	81	85	0.23	2.704	3.103	0	70	71	81	85
AUG	67	81	84	0.23	1.748	1.870	0	69	74	81	84
SEP	60	73	82	0.23	1.554	1.629	0	69	70	73	83
OCT	50	61	80	0.23	1.618	1.988	0	61	63	61	81
NOV	40	49	77	0.23	1.617	1.744	0	57	58	49	78
DEC	35	49	76	0.23	1.731	2.073	0	55	57	49	77

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Instream Chloride Monitoring

Date	Chloride (mg/L)
12/14/2005	1480
08/17/2006	190
03/09/2015	1398
03/10/2015	652
03/11/2015	164
03/12/2015	162
01/08/2016	160
07/17/2017	95
07/18/2017	220
07/19/2017	195
07/20/2017	85
Geometric Mean	261